



Surgical Case Report of Non Typhoidal Salmonella – A Rare Pathogen Causing Suppurative Submandibular Lymphadenitis

Authors

Dr N. Ashok Viswanath^{1*}, Dr V.M Soma Sunder²

Department of Microbiology, Panimalar Medical College Hospital and Research Institute
Poonamallee, Chennai, Tamilnadu, India

*Corresponding Author

Dr N.Ashok Viswanath M.B.B.S., M.D., D.N.B., M.N.A.M.S., PG Dip Infectious Diseases

Assistant Professor, Department of Clinical Microbiology,
Panimalar Medical College Hospital & Research Institute,
Varadharajapuram, Poonamallee, Chennai – 600123

Abstract

Salmonellosis is an infection caused by the members of the genus Salmonella, which are Gram negative bacilli. This may manifest as gastroenteritis, bacteremia and focal lesions. Focal Salmonella infection can occur with or without sustained bacteremia causing abscess formation along with clinical features of inflammation such as swelling and pain. The commonly involved systems include gastrointestinal system, vascular system, urinary system and uncommonly involved sites are pericardium, meninges, joints, bones, and lymphatic system. Here we present a case of a submandibular abscess caused by Salmonella species, in a 42 year old male diabetic with poor glycemic control. A 42 Year old male who was a known case of type 2 Diabetes mellitus on poor glycemic control was admitted to the surgical ward with the complaints of continuous fever for 5 days followed by swelling associated with pain in the right submandibular region. Pus culture and sensitivity yielded smooth, grey white, non haemolytic and non pigmented colonies on Blood Agar and non lactose fermenting colonies in Mac'Conkey agar. Inoculation was made on selective medium Salmonella Shigella agar which was incubated at 37°C for 24 hours and Jet black colonies were observed after the incubation time. The culture of the pus sample yielded Salmonella species.

Introduction

Salmonellosis is a disease caused by the bacterial species Salmonella which belongs to a gram negative bacilli of Enterobacteriaceae family which may manifest as gastroenteritis, bacteremia, focal lesions. Most of the infections are focal to enteric system with rare presentations occurring in other focal areas of a human body¹. Focal salmonella infection can occur with or without sustained

bacteremia causing pus formation along with clinical features of inflammation such as swelling and pain. The commonly involved system is gastrointestinal system, vascular system, urinary system and uncommonly involved site are pericardium, meninges, joints, bones, and lymphatic system. There are 2 species, Salmonella bongori and Salmonella enterica, over 2500 different serotypes or serovars have been identified to date. Salmonella

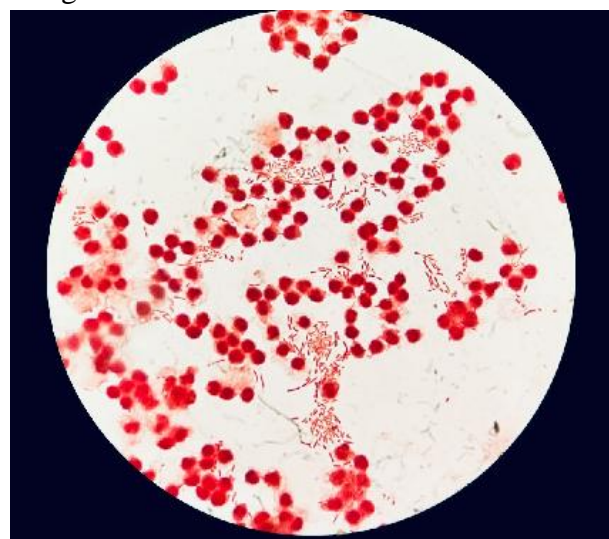
is a ubiquitous bacterial pathogen that can survive several weeks in a dry environment and several months in wet environment like water². While all serotypes can cause disease in humans, a few are host-specific and can reside in only one or a few animal species: for example, *Salmonella enterica* serotype Dublin in cattle and *Salmonella enterica* serotype Choleraesuis in pigs³. When these particular serotypes cause disease in humans, it is often invasive and can be life-threatening.

Case Report

A 42 Year old male who was a known case of type 2 Diabetes mellitus on poor glycemic control was admitted to the surgical ward with the complaints of Continuous high fever for 5 days followed by swelling associated with pain in the right submandibular region. On examination, the patient was febrile with the axillary temperature of 101 degree C. Sinus bradycardia was present at the time of admission with the pulse rate of 58 / minute. The blood pressure was normal. The blood investigations revealed Fasting Blood Sugar value of 231 mg/dl , Postprandial Blood Sugar of 367 mg/dl , HbA1c : 8.1 % Complete Blood Count showed increased Neutrophil count and decreased Eosinophil count . Serological tests revealed high C Reactive protein of 52 mg/dl, WIDAL test titre for O,H,AH,BH was inconclusive. Radiological investigation revealed mass in the submandibular region in front of anterior triangle with central anechoic hypo dense area with debris and septa floating within suggestive of haematoma or abscess. Following the investigations, the patient was taken for surgical Incision and drainage following standard surgical protocol . The surgical incision and drainage was done and 3ml of pus was obtained which was sent to Clinical Microbiology laboratory for Culture and Sensitivity .Pus obtained by Incision and drainage was cultured by conventional culture methods and was inoculated on blood agar, chocolate agar, Mac'Conkey agar and incubated at 37°C for 24 hours .Meanwhile Gram stain was performed based on huckers modification methodology on the pus smear which revealed

inflammatory smear showing plenty of polymorph nuclear cells with numerous gram negative bacilli (Image 1) .

Image 1: Microscopic examination of Pus by Gram staining



After the incubation time, the agar plates were observed, which showed grey white, non haemolytic, non pigmented colonies in blood agar, chocolate agar. Non lactose fermenting colonies were grown in Mac'Conkey agar. Appropriate biochemical tests were performed with the colonies. Antibiotic sensitivity testing was performed on Muller Hinton agar plate by Kirby Baur Disk diffusion method as per CLSI guidelines. VITEK II Compact Automated analyzer was used in complement to the routine conventional culture and sensitivity method for species identification and sensitivity testing. The biochemical tests were done along with the appropriate quality control for each tests including gram staining with ATCC control strains .The culture smears were made from the colonies were subjected to gram staining procedure which revealed gram negative bacilli (Image 2).

Additionally the sample was inoculated onto salmonella shigella agar and incubated for 18 hours at 37 degree C which revealed jet black colonies (Image 3). The organism was identified as *Salmonella species* and the subtypes could not be identified by routine biochemical and VITEK II Automated System. High titre sera was performed with 'o' and 'H' Polyvalent antisera which gave a positive result. The isolate was sent to Central Research Institute, Kasauli for species identification.

The Isolate was Sensitive to Ampicillin, Ceftriaxone, Cotrimoxazole, and Resistant to Ciprofloxacin & Ofloxacin. The patient was started on BACTRIM DS (Sulfamethoxazole + Trimethoprim) along with ultrasound guided abscess drainage. The patient started to improve from 2nd Postoperative day following incision and drainage. There was remarkably good therapeutic response to the antimicrobial treatment following culture and susceptibility report. With the help of automated systems like VITEK, the turnaround of time of culture reports have been hugely reduced thereby quick start of appropriate antibiotic is employed resulting in good prognosis of the patient.

Image 2 – Microscopic examination of culture smear stained by Grams staining procedure following Huckers modification of Gram staining showing gram negative bacilli.

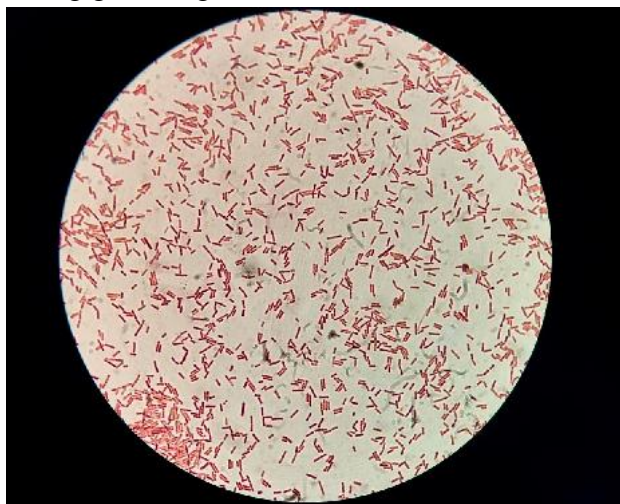


Image 3 – Jet black colonies in Salmonella Shigella agar



Discussion

Non Typhoidal salmonella infection is a rare infection with involvement of the lymphatic system. Susceptible individuals with the risk of lymphatic involvement include immunosuppressed and immunocompromised patients such as uncontrolled Type II Diabetes mellitus, prolonged use of corticosteroids, chemotherapy, immunodeficiency syndromes like Acquired Immunodeficiency Syndrome, Severe Combined Immunodeficiency. Early diagnosis and treatment with appropriate and suitable antibiotics is essential to avoid complications such as dissemination of infection and high risk of mortality. Our isolate was Sensitive to Ampicillin, Ceftriaxone, Cotrimoxazole, and Resistant to Ciprofloxacin & Ofloxacin. The patient had the underlying risk factor of uncontrolled type II Diabetes mellitus.

Conclusion

Type II Diabetes mellitus is important risk factor for acquiring Non typhoidal salmonella lesion involving the lymphatic system such as suppurative lymphadenitis. With the increasing number of opportunistic and multidrug resistant pathogen in community, particularly in immunocompromised patients, there is a need to diagnose the microbial infections early as possible by utilization of available resources, thereby preventing the complications like fatal septicemia and distant abscess formation like brain abscess.

References

1. Gordon MA. Salmonella infections in immunocompromised adults. *J Infect.* 2008; 56:413–422.
2. Gilks CF, Brindle RJ, Otieno LS. Life-threatening bacteraemia in HIV-1 seropositive adults admitted to hospital in Nairobi, Kenya. *Lancet.* 1990;336:545–549.
3. Offenstadt G, Pinta P, Hericord P. Multiple opportunistic infection due to AIDS in a previously healthy black woman from Zaire. *N Engl J Med.* 1983;308:775.

4. Bottone EJ, Wormser GP, Duncanson FP. Nontyphoidal salmonella bacteremia as an early infection in acquired immunodeficiency syndrome. *Diagn Microbiol Infect Dis.* 1984;2:247–250.
5. Mac Lennan CA, Gilchrist JJ, Gordon MA. Dysregulated humoral immunity to nontyphoidal salmonella in HIV-infected African adults. *Science.* 2010;328:508–512.
6. Fernanda Schreiber DJL, Houston A, Peters J. The human transcriptome during nontyphoid salmonella and HIV co-infection reveals attenuated NFkB-mediated inflammation and persistent cell cycle disruption. *J Infect Dis.* 2011;204:1237–1245.
7. Baker S, Holt K, van de Vosse E. High-throughput genotyping of *Salmonella enterica* serovar Typhi allowing geographical assignment of haplotypes and pathotypes within an urban district of Jakarta, Indonesia. *J Clin Microbiol.* 2008;46:1741–1746.
8. Graham SM, English M. Non-typhoidal salmonellae: a management challenge for children with community-acquired invasive disease in tropical African countries. *Lancet.* 2009;373:267–269.